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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/566,116      | 01/24/2006  | Akihisa Inoue        | OGOSH44USA          | 3700             |

270 7590 12/04/2006

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| EXAMINER |
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ZHU, WEIPING

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| ART UNIT | PAPER NUMBER |
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1742

DATE MAILED: 12/04/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/566,116

Applicant(s)

INOUE ET AL.

Examiner

Weiping Zhu

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 November 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 2,3 and 14-33 is/are pending in the application.
- 4a) Of the above claim(s) 15-19 and 21-33 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 2, 3, 14 and 20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date 6/2/2006.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Election/Restrictions*

1. Restriction to one of the following inventions is required under 35 U.S.C. 121:
  - I. Claims 2, 3 and 14-25, drawn to a sputter target, classified in class 204, subclass 298.13.
  - II. Claims 26-33, drawn to a method of making a sputtering target, classified in class 419, subclass 34.

The inventions are independent or distinct, each from the other because:

Inventions I and II are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make another and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case, a sputter target can be made by a materially different process such as performing injection molding at a high pressure and rapidly cooling this with a copper mold as disclosed in the instant invention (page 2, lines 5-6).

Because these inventions are independent or distinct for the reasons given above and there would be a serious burden on the examiner if restriction is not required because the inventions have acquired a separate status in the art in view of their different classification, restriction for examination purposes as indicated is proper.

During a telephone conversation with Mr. William Bak on Oct 31, 2006 a provisional election was made without traverse to prosecute the invention of I, claims 2, 3 and 14-25. Affirmation of this election must be made by applicant in replying to this

Office action. Claims 26-33 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

2. This application contains claims directed to the following patentably distinct species:

- 1). Zr as the primary component of the sputtering target (claims 14 and 20);
- 2). Pt as the primary component of the sputtering target (claims 15 and 21);
- 3). Pd as the primary component of the sputtering target (claims 16 and 22);
- 4). Fe as the primary component of the sputtering target (claims 17 and 23);
- 5). Co as the primary component of the sputtering target (claims 18 and 24) and
- 6). Cu as the primary component of the sputtering target (claims 19 and 25).

The species are independent or distinct because each alloying system is patentably distinct and is designed for a particular application.

Applicant is required under 35 U.S.C. 121 to elect a single disclosed species for prosecution on the merits to which the claims shall be restricted if no generic claim is finally held to be allowable. Currently, claims 2 and 3 are generic.

Applicant is advised that a reply to this requirement must include an identification of the species that is elected consonant with this requirement, and a listing of all claims readable thereon, including any claims subsequently added. An argument that a claim is allowable or that all claims are generic is considered nonresponsive unless accompanied by an election.

Upon the allowance of a generic claim, applicant will be entitled to consideration of claims to additional species which depend from or otherwise require all the limitations

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of an allowable generic claim as provided by 37 CFR 1.141. If claims are added after the election, applicant must indicate which are readable upon the elected species.

MPEP § 809.02(a).

During a telephone conversation with Mr. William Bak on Nov. 13, 2006, a provisional election was made without traverse to prosecute the invention of Zr as the primary component of the sputtering target, claims 14 and 20. Affirmation of this election must be made by applicant in replying to this Office action. Claims 15-19 and 21-25 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

In claims 14 and 20, line 3, "a group" should be changed to "the group" respectively.

***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2, 3, 14 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mathaudhu et al. [Material Research Society Symposium Proceedings (MRSSP) Vol. 754 @ 2003] in view of Rosenflanz et al. (US Publication: 2003/0126804) and further in view of Gu et al. (MRSSP Vol. 754 @ 2003).

With respect to claims 2, 14 and 20, Mathaudhu et al. (MRSSP Vol. 754 @ 2003) discloses a process using equal channel angular extrusion (ECAE) to consolidate

$\text{Zr}_{58.5}\text{Nb}_{2.8}\text{Cu}_{15.6}\text{Ni}_{12.8}\text{Al}_{10.3}$  powder into bulk amorphous metallic glass; The consolidations are performed on gas atomized powder and the powder is consolidated to nominal full density (i.e. the density is higher than 96.4% as claimed) after one extrusion pass (Abstract, page CC3.5.1).

The alloy of Mathaudhu et al. (MRSSP Vol. 754 @ 2003) is a three or more component system containing more than 50 at% of Zr as claimed in the instant claim 2 and at least one element is selected from a group consisting of Cu, Ni and Al as claimed in the instant claims 14 and 20. The final product of the process of Mathaudhu et al. (MRSSP Vol. 754 @ 2003) is a bulk amorphous metallic glass satisfying the requirements of atomic radius difference and negative heat of mixing as claimed in the instant claim 2.

With respect to claim 2, Mathaudhu et al. (MRSSP Vol. 754 @ 2003) disclose (Introduction, page CC3.5.1) that two main powder consolidation techniques, conventional area reduction extrusion [7-10] and hot isostatic pressing (HIP) [11-13] (i.e. consolidation and sintering), have been used to produce bulk metallic glasses; ECAE is a potential powder consolidation method that overcomes some of the difficulties associated with HIP and conventional extrusion.

With respect to claim 2, Mathaudhu et al. (MRSSP Vol. 754 @ 2003) does not teach producing a sputtering target from the bulk amorphous metallic glass.

Rosenflanz et al. ('804) discloses amorphous materials formed by gas atomization can be formed into sputtering targets (paragraph 83, page 8).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form the bulk metallic glass produced in the process of Mathaudhu et al. (MRSSP Vol. 754 @ 2003) into a sputtering target as disclosed by Rosenflanz et al. ('804) in order to utilize the bulk metallic glass for various applications requiring high strength, hardness and resistance to both corrosion and wear as disclosed by Mathaudhu et al. (MRSSP Vol. 754 @ 2003) (Introduction, page CC3.5.1).

With respect to claims 2 and 3, Mathaudhu et al. (MRSSP Vol. 754 @ 2003) in view of Rosenflanz et al. ('804) does not teach the bulk metallic glass has an average crystallite size of 1nm to 5 nm as claimed in the instant claim 2 and has an average crystallite size of 1 nm to 2 nm as claimed in the instant claim 3.

Gu et al. (MRSSP Vol. 754 @ 2003) discloses nanocrystalline particles are observed in zirconium based metallic glass to have a narrow size distribution, mostly ranging from 2-5 nm (Results, page CC7.9.2).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to form zirconium based metallic glass composites with 2-5 nm nanocrystalline particles in the process of Mathaudhu et al. (MRSSP Vol. 754 @ 2003) as disclosed by Gu et al. (MRSSP Vol. 754 @ 2003) in order to improve the ductility of metallic glass as disclosed by Gu et al. (MRSSP Vol. 754 @ 2003) (Introduction, page CC7.9.1).

### ***Conclusion***

4. This Office action is made non-final. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Weiping Zhu whose

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telephone number is 571-272-6725. The examiner can normally be reached on 8:30 - 16:30 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Roy King can be reached on 571-272-1244. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

WZ

11/22/2006

ROY KING   
SUPERVISORY PATENT EXAMINER  
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